Fact Sheet
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Farm Safety Association

BIG BALE SAFETY

Introduction

Much of Ontario's hay crop is now harvested as large bales. Adoption of big package haying systems has been very rapid, largely because of the major labour savings it provides.

Along with the big bale benefits have come a number of hazards. The equipment used for large bale formation and handling harbours familiar dangers that are associated with all farm machinery. Round balers do feature some unique hazards, and the horsepower involved is usually greater than was required with more traditional, small, square baling systems.

However, the biggest risk -- and the one responsible for most of the serious injuries and deaths - is the physical nature of the balers themselves. A compact package of hay or straw weighing from 500 pounds to 1.5 tons (225 kg - 1300 kg) definitely poses some threat to human life and limb at every stage of handling! And because some bales are round, they can roll relatively freely and will gain momentum if the path of travel is downhill.

Equipment manuals should be part of every farm's safety program.

Knowledge is crucial

It is every farmer's responsibility to know the specific requirements, precautions and hazards associated with a particular operation. The manual that is provided with every piece of equipment is the primary source of information on safe, efficient operation. Anyone who runs the machinery should review this material. It is the responsibility of the farm owner or manager to make sure that all employees are well trained in the operation of equipment they will be using.

Advance preparation makes safety sense

Comprehensive maintenance in advance of the major use season can minimize downtime in the field. In addition to improving harvest efficiency, this pre-season preparation may also prevent an accident.

Following is a checklist of procedures which can help detect potential hazards and improve the efficiency of your baler:

- Clean the baler thoroughly to remove crop residues, mouse nests, and other debris. Lubricate according to manufacturer's specs.
- Check for loose or missing nuts, screws, guards, or damaged pickup teeth. Replace missing guards and shields.
- Inspect all belts and chains for evidence of wear or breakage. Belt tension should be matched to prevent slippage, which can cause plugging and damage due to heat buildup. Before replacing a belt or chain, consult the manual for instructions on securing the upper chain or removing load from the belt tension springs.
- Hydraulic hoses should be clean, in good repair and hooked up correctly. Check the

twine feeding and cutting mechanisms for proper operation. Also check the slip clutch, roll scraper, and rear gate latch to make sure they are adjusted and functioning according to the manufacturer's recommendations.

- Check lights, reflectors and SMV. Properly operating fire extinguishers should be mounted on both tractor and baler.

Baler Operation

Operators must have in-depth knowledge of the tractor and baler they are using. It is important to understand how all components and systems are activated on both machines.

- All protective devices should be in place and securely fastened.
- Before starting equipment, check for broken, missing, or damaged parts. Check the condition of tires. Inspect the hydraulic system, using a scrap of wood or cardboard (not your hand!) to detect leaks. Make all necessary repairs before heading for the field.
- Dry crop materials are flammable. Remove trash from behind shields, covers and from around machinery components.
- Lubricate according to directions in manufacturer's manuals.
- Check and adjust components in accordance with instructions in the manual.

Never attempt to clean, lubricate, or adjust the baler unless the tractor engine is turned off, the PTO disengaged, and the ignition key removed.

Walk around the equipment before starting. Check that the rear gate is securely closed. Make sure there is no one in the vicinity. Let others know you are starting up, and don't do so until everyone is clear of the danger area.

Remember - this is a *one-person* operation! Never allow anyone to ride with you on either the tractor or the baler.

Preparing to bale

Most farmers are familiar with hazards in and around their own fields. Extra caution is needed on slopes, around ditches, or near overhead power lines which could be a hazard when raising the baler's rear gate. If someone else will be operating the baler, make sure that they are thoroughly familiar with the hazards.

The pickup should be adjusted to provide adequate ground clearance. If tines contact the ground, the operator could be showered with earth and stones, and the baler won't feed properly. Engage PTO while the equipment is stationary and look and listen for any signs of trouble. Cycle all baler hydraulic systems to assure proper functioning. Check twine feeding and cutting mechanism for proper operation.

Obviously, the material to be harvested must be in suitable condition for baling (20 percent moisture or less). Excessive plugging is likely if the crop is wet.

Ground speed should be matched to crop conditions and windrow size. Keep the pickup high enough to aggressively deliver crop into the baler inlet. If the machine is equipped with feed rolls, maintain recommended clearance and pressure setting. Operator's manuals provide information on correct adjustments, operating procedures for various crops and conditions, etc.

Never try to unplug, clean out or adjust a baler while it is operating. Severe injury or death could be the result. Wait until *all* machine motion has stopped before approaching the baler.

Don't try to feed material into a machine by hand - the hay will be taken in faster than you can let go!

Refer to the operator's manual for bale tying instructions. Resist the temptation to produce oversized bales, which can make bale discharge difficult or damage components.

Safe ejection

Correct procedure for discharging bales is described in operator's manuals. It is important to always keep in mind the fact that round bales can roll downhill! Serious injury and/or extensive property damage could result from careless ejection. Whenever possible, discharge bales on flat, level ground. No

one should be near the rear of the baler at time of ejection.

If it is necessary to open the tailgate for manual bale removal or unplugging, shift the tractor to neutral or park, lock the brakes, and disengage the PTO. Raise the tailgate hydraulically, lock it in place, then shut off the tractor engine and remove the ignition key.

Fire precautions

If a fire starts in the baler, pull into a level, open area and eject the bale. Drive clear of the fire area, call for help if possible, then use your extinguisher to bring the fire under control.

Safe transport

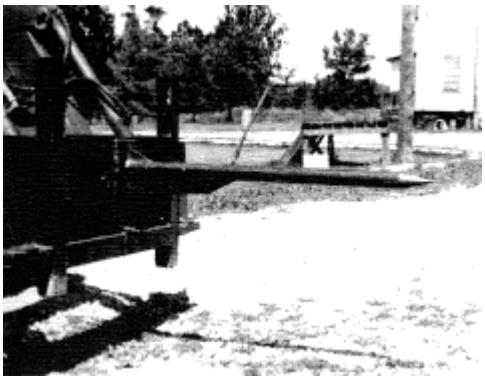
Be sure to obey all applicable traffic regulations when travelling on public roads. Lock brake pedals together and use safety chains. The baler should be equipped with required lights, reflectors and a clearly visible SMV emblem.

A well maintained baler will minimize breakdowns.

Large bale handling hazards

Serious accidents associated with large bale systems seem to be happening during the handling of the big hay packages.

A number of operators have been seriously injured when improperly secured bales rolled down the arms of front-end tractor loaders. It is strongly recommended that tractors used to handle the big bales be equipped with 4-post rollover protective structures (ROPS), if available for your model of tractor.



Front end loaders must be equipped with proper restraining devices for handling large bales, such as this spear.

However, we shouldn't be relying on ROPS to cushion the blow, and bales shouldn't be moving down loader arms to begin with! A loader should be equipped with a spear or grapple that is specifically designed for handling the size of a large bale that is being produced on-farm. Most importantly, the loader should incorporate a restraining device that will prevent a bale that has come loose from sliding backward.

The loader tractor must be large enough and equipped with sufficient counterweight to handle bales safely. Set wheels at maximum width to increase stability.

Try to avoid steep slopes and rough terrain when conveying bales with the loader. If it is impossible to avoid sloping land, approach bales from the downhill side.

As with any loader operation, avoid sudden starts, stops or changes of direction. Always keep the bale as low as possible for maximum stability. A one ton bale puts the centre of gravity at a precarious level when a loader is raised high. The risk of a bale breaking free is also greater when the loader is raised. Be extremely cautious, and travel only at low speed.

Insist that other workers and bystanders stay well clear of bale handling operations.

Use good judgement when stacking bales in storage. High stacks mean more efficient use of available space, but subsequent removal could be very hazardous.

If bales are to be handled with a 3-point hitch attachment, the tractor must have sufficient front

counterweight for stability and safe handling. Practice extreme caution when backing up to a bale. Keep everyone away from the bale and the forks.

Transport considerations

A tremendous variety of wagons, truck frames, etc. have been developed for conveying loads of large bales. Some of these are quite sophisticated, with provision for automated loading and unloading.

Such purpose-designed equipment is safer for transporting round bales. However, we recognize that many farmers will continue to load their big bales on flatbed wagons that were originally built for conventional square bales. If the majority of a farm's harvest is likely to be in the form of large round bales, the owner should consider replacing at least one flat rack with a platform designed to carry round bales. Make sure that the round bale platform won't encourage the building of loads that exceed capacity of the running gear.

It is very important for large bales to be well secured on a flat rack. They should be tied down if the load is to be transported on a public roadway. An innocent bystander was killed by round bales that jolted loose from a flat rack at the top of a hill on a township road.

Following are some additional pointers for transporting loads of large round bales:

- The load being pulled should be no heavier than the pulling unit.
- Inspect the transporting unit before going on the roadway.
- Take advantage of 'engine braking.' Use the same gear going down a hill as you would going up. Keep in mind that most tractors only have two wheel brakes.
- Wagons used to haul bales should be of sufficient width and have end racks to prevent bales from moving off either end during transport.
- Hitching should be secure. Use a top quality draw pin and safety chain.
- Make sure you can signal your intention to turn on the roadway - use escort vehicles if necessary.
- SMV sign should be clearly visible on the rear of the wagon.
- Never carry a large bale on the front end loader while pulling a loaded wagon.

Front end loaders must be equipped with proper restraining devices for handling large bales. Counterweights on the tractor may help prevent tipping.

Summary

The basics of equipment safety apply to large bale harvest and handling. The major new risk encountered when switching to this system of hay handling is the new forage package itself. These bales can roll, and their tremendous weight is sufficient to crush a human body.

Please keep the following points in mind when working with large bales:

- Good maintenance and timely lubrication minimize the breakdowns that can lead to frustration and carelessness.
- Never attempt to unplug a baler or carry out adjustments and repairs with power engaged.
- Place bales in a manner that will minimize potential for rolling.
- Handling equipment should be large enough and properly counterweighted.
- When handling or transporting bales, use properly-designed equipment that incorporates restraining devices. Avoid sudden motions, and travel at low speed.
- Always carry bales as low as possible with a tractor loader.

- Bystanders and other workers should stay well clear of all big bale operations. And remember, NO RIDERS!
- The best instructions for safe, efficient use of equipment can be found in the manual. Every operator should be familiar with this information.
